

REMARKS

Applicant appreciates the thorough examination of the present application that is reflected in the Official Action of February 2, 2004. Applicant also appreciates the Examiner's indication that Claims 17-18, 23-25, and 36-41 are allowed, and that Claims 6-8, 13-16, 19, 31-33, and 47 are objected to but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The objected to claims have not been rewritten in independent form because Applicant respectfully submits that all of the pending claims are patentable for the reasons that will now be described herein. For the convenience of the Examiner, the objections and rejections will be addressed in the order in which they were made at Pages 2-8 of the Detailed Action.

The Objections to the Specification and Claims

The Cross Reference section on page 1 has been amended to correct an error in the cited parent application no. 08/898,392, and to recite the corresponding issued US patent numbers for each of the cited parent applications.

The Brief Description of the Drawings section on page 4 has been amended to describe Figure 4.

Claims 1, 14, 19, 26, and 30 have been amended to insert a space in the recitation "ofunquantized" to provide the separate words "of unquantized".

Applicant respectfully requests withdrawal of the objections to the specification in view of the present amendments to the specification and claims.

Applicant has also amended Claims 5, 11, 12, and 17 to replace the recitation "include" with "comprise" to be consistent with the earlier filed Preliminary Amendment dated February 2, 2001. Claims 40 and 41 have been amended to replace the reference to "mobile terminal" with "base station" to be consistent with Claim 39 from which they depend. Claim 42 has been amended to recite "mobile communication system receiver" in the preamble, and dependent Claims 43-51 have been amended to be consistent with Claim 42 from which they depend.

Claims 1, 26, and 42 Are Patentable Over Arslan et al. in view of Fukasawa et al.

Claim 1 recites:

1. A method of decoding quantized and unquantized wanted data symbols from received signal samples, comprising:

processing a group of currently received signal samples to determine a corresponding current set of unquantized wanted data symbols and an interfering waveform representative of a sum of other unwanted data symbols by subtracting an amount of a previously decoded set of quantized wanted symbols and a previously determined interfering waveform; and

quantizing said determined current set of unquantized wanted symbols to obtain corresponding quantized symbols.

Independent Claim 1 and analogous independent Claims 26 and 42 stand rejected under 35 U.S.C. §103(a) as unpatentable over Arslan et al. in "New Methods for Adaptive Noise Suppression", IEEE International Conference on Acoustics, Speech, and Signal Processing 1995, 9-12 May 1995, vol. 1, pp. 812-815 ("Arslan et al."), and further in view of U.S. Patent No. 5,533,012 ("Fukasawa et al."). However, Applicant respectfully submits that to establish a *prima facie* case of obviousness, three basic criteria must be met. The prior art reference or references when combined must teach or suggest *all* the claim limitations. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and there must be a reasonable expectation of success of the combination. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found *in the prior art*, not in applicant's disclosure. See MPEP § 2143. As affirmed by the Court of Appeals for the Federal Circuit, to support combining references in a § 103 rejection, evidence of a suggestion, teaching, or motivation to combine must be *clear and particular*, and this requirement is not met by merely offering broad, conclusory statements about teachings of references. *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). In an even more recent decision, the Court of Appeals for the Federal Circuit has stated that, to support combining or modifying references, there must be particular evidence from the prior art as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed. *In re Kotzab*, 55, USPQ2d 1313, 1317 (Fed. Cir. 2000).

In particular, as noted above, Claim 1 recites (emphasis added):

processing a group of ***currently received signal samples*** to determine a corresponding current set of unquantized wanted data symbols and an interfering waveform representative of a sum of other unwanted data symbols by subtracting an amount of a ***previously decoded set of quantized wanted symbols*** and a previously determined interfering waveform; and
quantizing said determined current set of unquantized wanted symbols to obtain corresponding quantized symbols.

An embodiment of the highlighted recitations of Claim 1 is discussed in the specification at page 12 with reference to FIG. 2, shown below, as follows:

At the subtract block 24, the above equations are used to subtract the influence of an earlier-determined symbol S_i and an earlier-determined interference waveform value W_i . In a quantize block 26, the signal, with the influence of earlier symbols and interference now subtracted is separated into a quantized symbol S_{i+1} and a new waveform point W_{i+1} The determined S_{i+1} and W_{i+1} values are then fed back (decision feedback) via a delay block 28 to the subtract block 24 to subtract their influence on the next two signal samples to be decoded, and the stream S_i, S_{i+1} is output.

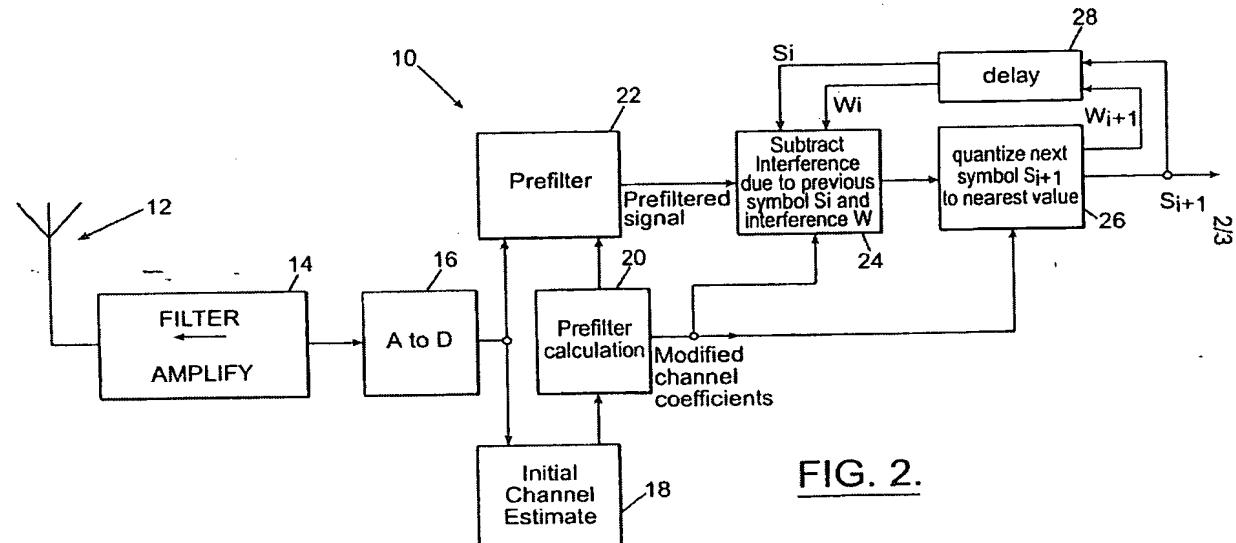


FIG. 2.

Accordingly, as recited in Claim 1, and as explained in the specification with regard to FIG. 2, a previously decoded set of quantized wanted signals and a previously determined interfering waveform are subtracted from a group of currently received signal samples to determine a current set of unquantized wanted data symbols, and the determined current set of unquantized wanted data symbols are then quantized to obtain quantized symbols.

The Office Action concedes that Arslan et al. "does not state the step of quantizing the previous decoded set of wanted symbols and quantizing the determined current set of unquantized wanted symbols to obtain corresponding quantized symbols." (Office Action, Page 3). Arslan et al. describes spectral subtraction in which "clean speech spectrum can be estimated by simply subtracting the noise spectrum from the noisy speech spectrum", but fails to teach or suggest *subtracting a previously decoded set of quantized wanted signals and a previously determined interfering waveform from a group of currently received signal samples to determine a current set of unquantized wanted data symbols which is then quantized.*

Fukasawa et al. discloses an adaptive quantizer (See Fig. 8, Col. 14, lines 7-19), but is devoid of any teaching or suggestion of *subtracting a previously decoded set of quantized wanted signals and a previously determined interfering waveform from a group of currently received signal samples to determine a current set of unquantized wanted data symbols or of quantizing a current set of unquantized wanted data symbols determined by such subtraction.*

Consequently, even if Arslan et al. is combined with Fukasawa et al., the references would not teach or suggest *all* the claim recitations of Claim 1.

Moreover, Applicants respectfully submit that the § 103 rejection in the Official Action fails to meet the requirements of MPEP § 2143 as there is no clear and particular suggestion, teaching, or motivation as to why one would modify Arslan et al. and/or Fukasawa et al. As described, Arslan et al. describes spectral subtraction for noise suppression. Fukasawa et al. describes an adaptive quantizer. Neither reference provides a motivation to modify the reference to subtract a previously decoded set of quantized wanted signals and a previously determined interfering waveform from a group of currently received signal samples to determine a current set of unquantized wanted data symbols, or to quantize a current set of unquantized wanted data symbols determined by such subtraction. It thus appears that the Office Action is using improper hindsight in light of Applicant's disclosure in the pending application to combine the cited patents. Applicant thus submits that the Office Action fails to provide clear and particular evidence from the art of record of a motivation to combine the cited references to produce the recitations of Claim 1. Consequently, Arslan et al. and Fukasawa et al. are not properly combinable to reject Claim 1.

For at least these reasons, Applicant respectfully submits that Claim 1 is patentable over Arslan et al. in view of Fukasawa et al.

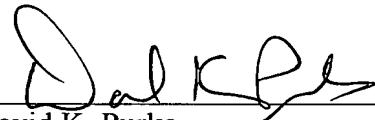
Claims 26 and 42 are analogous to Claim 1 and are patentable for substantially the same reasons that were described above. This analysis will not be repeated here for brevity.

Dependent Claims 2-13, 27-35, and 43-51 are patentable at least based on the patentability of the independent claims from which they depend as discussed above.

CONCLUSION

Accordingly, Applicant respectfully requests the withdrawal of all objections and rejections and the allowance of all claims in due course. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is encouraged to contact the undersigned by telephone at (919) 854-1400.

Respectfully submitted,



David K. Purks
Attorney for Applicants
Registration No. 40,133

Dated: March 16, 2004

USPTO Customer No. 20792
Myers Bigel Sibley & Sajovec
Post Office Box 37428
Raleigh, North Carolina 27627
Telephone: 919/854-1400
Facsimile: 919/854-1401